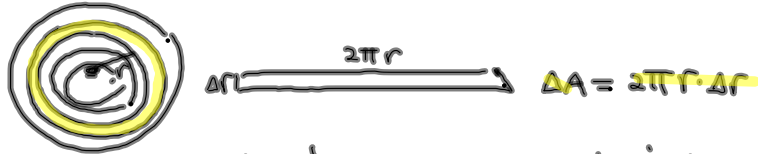


23.

$$\text{density} = 10,000(2-r) \frac{\text{people}}{m^2}$$

a) $r=2$

b)



$$c) \Delta p \approx 10,000(2-r) \frac{\text{people}}{m^2} 2\pi r \Delta r = \text{people in the ring}$$

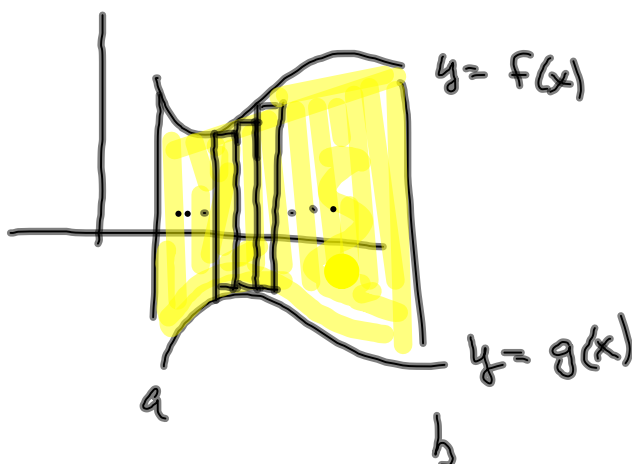
$$d) \text{Total Pop} \approx \sum_{i=1}^n 10,000(2-r_i) 2\pi r_i \Delta r$$

$$\approx \lim_{\Delta r \rightarrow 0} \sum_{i=1}^n 10,000(2-r_i) 2\pi r_i \Delta r$$

$$83,776 = \int_0^2 10,000(2-r) 2\pi r dr$$

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7.2 area between 2 curves



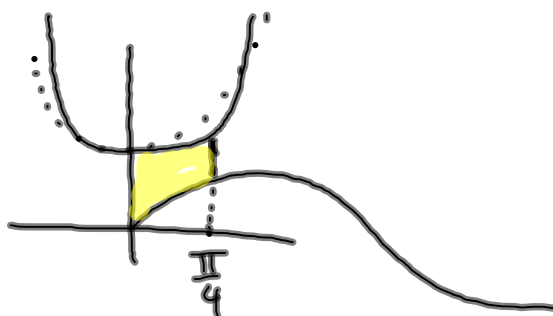
$$y=f(x) \quad \lim_{\Delta x \rightarrow 0} \sum_{i=1}^n (f(x_i) - g(x_i)) \Delta x$$

$$\int_a^b f(x) - g(x) dx$$

↑ ↑
 top bottom

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find the area between $y = \sec^2 x$ & $y = \sin x$
on $[0, \frac{\pi}{4}]$



$$\int_0^{\frac{\pi}{4}} \sec^2 x - \sin x \, dx$$

$$\tan x + \cos x \Big|_0^{\frac{\pi}{4}}$$

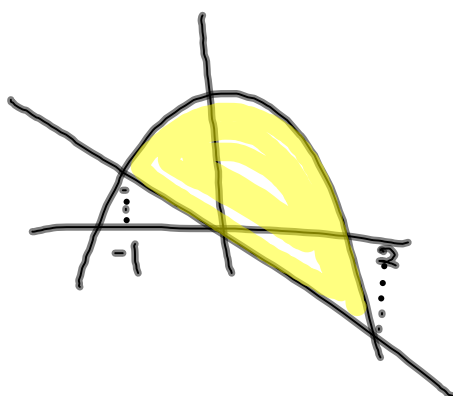
$$\left(\tan \frac{\pi}{4} + \cos \frac{\pi}{4} \right) - (\tan 0 + \cos 0)$$

$$1 + \frac{\sqrt{2}}{2} - 0 - 1$$

$$\frac{\sqrt{2}}{2}$$

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Find the area bounded by $y = 2 - x^2$ & $y = -x$



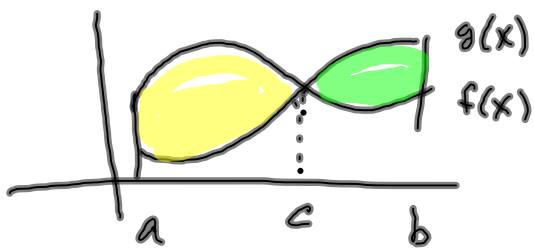
$$2 - x^2 = -x$$

$$0 = x^2 - x - 2$$

$$0 = (x - 2)(x + 1)$$

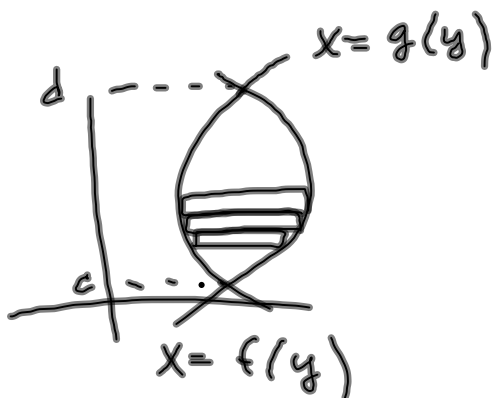
$$\int_{-1}^2 (2 - x^2) - (-x) \, dx = \frac{9}{2}$$

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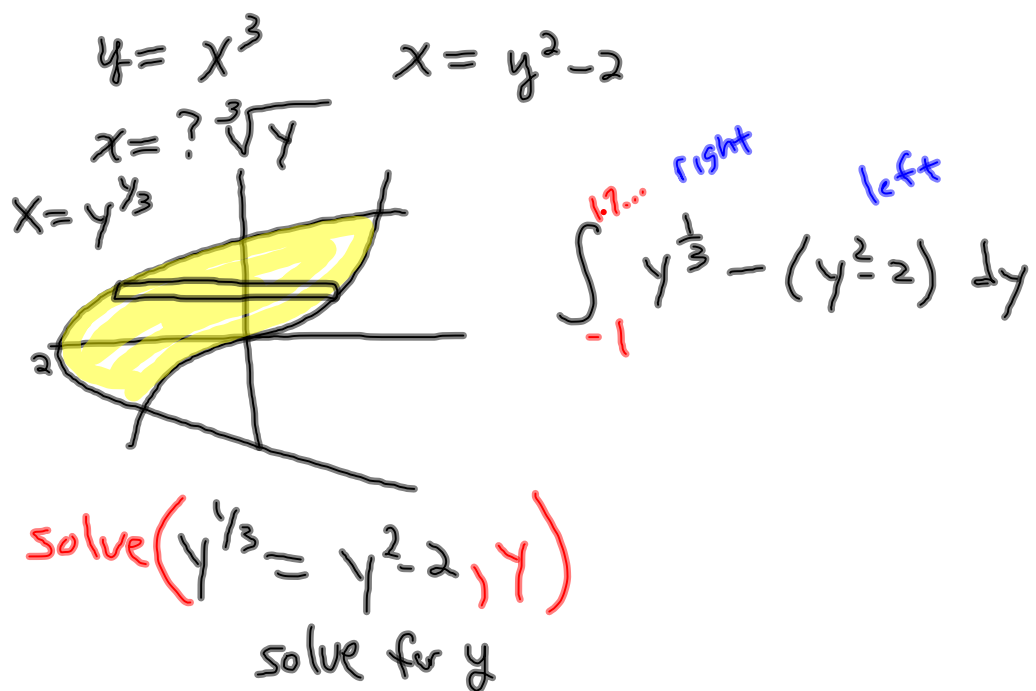
$$\int_a^c f(x) - g(x) \, dx + \int_c^b g(x) - f(x) \, dx$$

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$$\int_c^d f(y) - g(y) \, dy$$

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Jan 12-2:01 PM